2.0 Project Description

As prescribed in the California Environmental Quality Act (CEQA) Guidelines §15124, this section of the Draft Final EIR presents the Project Description, including a statement of the goals and objectives of the proposed Eagle Mountain Pumped Storage Project (Project), the precise location and boundaries of the Project site, and a general description of its technical, economic, and environmental characteristics. The Project Description provides detailed information regarding all Project components, facilities, operation, and project design features (PDFs). In addition, potential environmental effects associated with construction and operations of the proposed Project are described, and the public agencies that are expected to use this Draft Final EIR in their decision-making process are identified. A list of the approvals and permits required to implement the proposed Project in compliance with applicable federal, state, and local laws, regulations, or policies is also provided.

2.1 Existing Environment and Background

The Eagle Crest Energy Company (ECE or Project Applicant or Licensee) has submitted to the State Water Resources Control Board (State Water Board) an application for a Section 401 Water Quality Certification, under the Clean Water Act. The Project Applicant intends to develop the proposed Project near the town of Eagle Mountain (just north of the unincorporated community of Desert Center), located within eastern Riverside County, California (Figure 2-1).

The proposed Project is a large scale energy storage project that will provide electrical generation peaking capacity and transmission system regulating benefits deemed essential for integration of a high level of renewable wind and solar generation sources, and to maintain transmission reliability for southwestern electric utilities.

The basic mode of operation for the Project will be typical of most pumped storage projects: storing off-peak energy for use to provide peaking generation during periods of high power demand. This pattern would use available energy generation from the transmission grid at night and on weekends to pump water from a lower reservoir to an upper reservoir where it will be stored for subsequent use. During periods of peak demand, and as needed for transmission grid reliability, the Project would operate as a hydroelectric generation project, releasing stored water from the upper reservoir through turbines to generate power, and then flowing back to the lower reservoir.

The Project, with a cycle efficiency of 79 percent would use approximately 1.2 kilowatt hour (kWh) of off-peak energy to produce 1.0 kWh of peak power, and as-needed instantly available power for transmission grid operations. The annual plant capacity factor (ratio of average annual output to installed capacity) is expected to be in the range of 20 to 37.8 percent. For purposes of analysis, operations (pump back or generation) are assumed to be essentially constant

2.2 Statement of Goals & Objectives

The proposed Project would provide hydroelectric generation to meet part of California's power requirements, resource diversity, capacity needs, and reliable grid operations. The Project would have an installed capacity of 1,300 megawatts (MW) and generate approximately 4,308 gigawatt hours (GWh) per year, (assuming a capacity factor of 37.8 percent).

Goal and Objective #1 – Support California's Energy Policy

California's energy policy calls for maintaining a reliable, efficient, and affordable energy system that minimizes the environmental impacts of energy production and use (CEC, 2009). The California Energy Commission (CEC) recognizes that although the recent economic downturn has reduced energy demand in the short-term, demand is expected to grow over time as the economy recovers. It is essential that the California's energy sectors be flexible enough to respond to future fluctuations in the economy and that the state continue to develop and adopt the "green" technologies that are critical for long-term reliability and economic growth (CEC, 2009).

The proposed Project is an energy storage project, defined by the state of California as "a commercially available technology that is capable of absorbing energy, storing it for a period of time, and thereafter dispatching the energy" (Assembly Bill (AB) 2514 (Statutes 2010, Chapter 469, Skinner)).

AB 2514 states that:

> The Legislature finds and declares all of the following:
>
> (a) Expanding the use of energy storage systems can assist electrical corporations, electric service providers, community choice aggregators, and local publicly owned electric utilities in integrating increased amounts of renewable energy resources into the electrical transmission and distribution grid in a manner that minimizes emissions of greenhouse gases.
>
> (b) Additional energy storage systems can optimize the use of the significant additional amounts of variable, intermittent, and offpeak electrical generation from wind and solar energy that will be entering the California power mix on an accelerated basis.
>
> (c) Expanded use of energy storage systems can reduce costs to ratepayers by avoiding or deferring the need for new fossil fuel-powered peaking powerplants and avoiding or deferring distribution and transmission system upgrades and expansion of the grid.

(d) Expanded use of energy storage systems will reduce the use of electricity generated from fossil fuels to meet peak load requirements on days with high electricity demand and can avoid or reduce the use of electricity generated by high carbon-emitting electrical generating facilities during those high electricity demand periods. This will have substantial co benefits from reduced emissions of criteria pollutants.

(e) Use of energy storage systems to provide the ancillary services otherwise provided by fossil-fueled generating facilities will reduce emissions of carbon dioxide and criteria pollutants.

(f) There are significant barriers to obtaining the benefits of energy storage systems, including inadequate evaluation of the use of energy storage to integrate renewable energy resources into the transmission and distribution grid through long-term electricity resource planning, lack of recognition of technological and marketplace advancements, and inadequate statutory and regulatory support.

The proposed Project would provide the energy storage benefits described in AB 2514, including: providing assistance with integration of renewable energy into the transmission grid; avoiding or deferring the need for new fossil fuel-powered peaking power plants and expansion of the transmission grid; reducing the use of electricity generated from fossil fuels to meet peak load requirements; reducing emissions; and providing ancillary services otherwise provided by fossil-fueled generating facilities thus reducing emissions of carbon dioxide and criteria pollutants. The proposed Project would make a significant contribution to California’s energy reliability and efficiency by providing flexibility in generation and providing energy storage for peak power demands and integration of renewable energy projects in transmission grid operations.

Goal and Objective #2 – Provide Generation to Meet Part of California’s Peak Power Requirements

Power from the proposed Project would help meet a need for power in the southern California region in both the short- and long-term. The proposed Project would be capable of providing 1,300 MW of generating capacity, with an energy storage volume capable of providing maximum generating discharge for 18.5 hours. Water stored in the upper reservoir would provide approximately 22,000 megawatt hours (MWh) of on-peak generation.

According to the CEC’s 2009 Integrated Energy Policy Report (IEPR), CEC-100-2009-003-CMF, the CEC staff forecast of future electricity demand shows that consumption will grow by 1.2 percent per year from 2010 to 2018, with peak demand growing an average of 1.3 percent annually over the same period. The current forecast is markedly lower than the forecast in the

2007 Integrated Energy Policy Report, primarily because of lower expected economic growth in both the near- and long-term as well as increased expectations of savings from energy efficiency. Because of economic uncertainties surrounding the current recession and the timing of potential recovery, the IEPR Committee directed staff to look in its forecast at alternative scenarios of economic and demographic growth and their impacts on electricity demand. Staff analyzed both optimistic and pessimistic scenarios and found only small differences in projected electricity demand. Annual growth rates from 2010 to 2020 for electricity consumption and peak demand would increase from 1.2 percent and 1.3 percent, respectively, to 1.3 percent and 1.4 percent in the optimistic case and fall to 1.1 percent each under the pessimistic scenario.

Figure 2-4 shows the 2009 CEC projection for energy consumption in California. California is projected to use 309,581 GWh of electricity by 2018. Figure 2-5 shows the 2009 CEC projection for peak demand. Peak demand is projected to reach 69,240 MW by 2018.

Goal and Objective #3 – Provide Energy Storage for Integration of Renewable Energy Generation

According to the California Public Utilities Commission (CPUC),

> California's energy policies require the development of new types of renewable and distributed generation resources, such as wind and solar. These resources by their nature are intermittent and may not be directly dispatched by system operators to meet customer load. Since operators of the electricity grid must constantly match electricity supply and demand, intermittent renewable resources are challenging to incorporate into the electricity grid. Additionally renewable generation can often occur at times when there is reduced demand for power. Energy storage technologies may provide an effective means for addressing the challenges of relying upon intermittent and off-peak renewable generation.
>
> Energy storage technology may also offer California economic and environmental benefits. By utilizing energy storage technologies to store intermittent and off-peak renewable power, the state may: reduce greenhouse gas emissions from carbon-based electricity production; avoid the need to build more transmission and generation facilities; increase system efficiencies and reliability; and, generate economic activity through the manufacturing and operation of new technologies.[1]

[1] Order Instituting Rulemaking Pursuant to Assembly Bill 2514 to Consider the Adoption of Procurement Targets for Viable and Cost-effective Energy Storage Systems.

As noted above in Goal & Objective No. 1, AB 2514 specifically adopted policy for development and promotion of energy storage technologies, and directs the CPUC to open a proceeding by March 1, 2012 to determine appropriate targets, if any, for each load-serving entity (LSE) as defined by Pubic Utility Code Section 380 (j) to procure viable and cost-effective energy storage systems and, by October 1, 2013, to adopt an energy storage system procurement targets, if determined to be appropriate, to be achieved by each LSE by December 31, 2015, and a second target to be achieved by each LSE by December 31, 2020.

Although the Legislature gave the CPUC until March 1, 2012 to open a proceeding on energy storage, the CPUC, "sees the enactment of AB 2514 as an important opportunity for this CPUC to continue its rational implementation of advanced sustainable energy technologies and the integration of intermittent resources in our electricity grid." Therefore, the CPUC opened a proceeding on their own motion on December 21, 2010 to initiate policy for California utilities to consider the procurement of viable and cost-effective energy storage systems.[2]

The California Energy Commission (CEC) has also recognized the need for storage as an essential element in attaining California's Renewable Portfolio Standard (RPS) goals of 2020. The CEC recognizes that storage is not simply generation, transmission, or distribution, but rather a special and distinct function required for reliable grid operations and power flow management. This recognition is consistent with the unanimous consensus among the transmission system operators and the major utilities that adding significant storage capacity is the only means to successfully integrate wind and solar power to meet California's 33 percent renewable power generation goals and maintain reliable grid operations. As a related consequence, large scale energy storage will also be essential to meeting California's goals for reductions in greenhouse gases (GHG) by displacing existing natural gas peak power generation.[3]

The need for pumped storage as a companion to renewable energy development is also well recognized by national energy policy makers. For example, the U. S. Department of Energy (DOE) Secretary Steven Chu's remarks on the Nation's Energy Future – presented at the DOE National Electricity Delivery Forum, February 18, 2009[4] – specifically cited the benefits of pumped storage for integrating renewable energy sources and maintaining reliable transmission operations. Likewise, comments of FERC Chairman Jon Wellinghoff before the Senate Energy

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[2] Order Instituting Rulemaking Pursuant to Assembly Bill 2514 to Consider the Adoption of Procurement Targets for Viable and Cost-effective Energy Storage Systems.

[3] Workshop participants and CEC staff indicated that California will need an estimated minimum of 4,000 MW of energy storage by 2020.

[4] *See* Secretary Steven Chu's address at the National Electricity Delivery Forum (February 18, 2009), *available at* http://www.c-span.org/Watch/watch.aspx?MediaId=HP-A-15640

and Natural Resources Committee Hearing in December 10, 2009[5] noted these same benefits and the importance for storage as one part of the nation's future energy strategy.

Pumped storage generation is recognized as one of only two feasible "bulk storage" technologies (Compressed Air Energy Storage – CAES – being the other), and the only one to have been proven on large scales. Other emerging technologies (mainly batteries and flywheels) are much smaller in scale and have significant R&D timelines, but are expected to play a role in small scale applications and management of electricity distribution systems.

A recent study for the DOE Energy Storage Systems Program (*Energy Storage for the Electricity Grid: Benefits and Market Potential Assessment Guide*, Sandia Report, February 2010; Jim Eyer and Garth Corey), highlights numerous renewable energy integration applications of energy storage including renewable energy time-shift, capacity firming, and wind generation grid integration.

The proposed Project's location in the southern California transmission grid is complimentary to support existing wind power generation in the San Gorgonio Pass, Tehachapi, and the Salton Sea area, and thousands of megawatts of proposed wind and solar power generation in the Mohave Desert, Chuckwalla Basin, and Palo Verde Valley.[6]

Goal and Objective #4 – Provide Ancillary Services for Management of the Transmission Grid

Specific transmission operations – known collectively as "ancillary services" – include spinning reserves, voltage regulation, load following, Black Start, and possibly protection against over-generation. Pumped storage is capable of providing all of these ancillary services.

Spinning reserve is defined by the CAISO as the on-line reserve capacity that is synchronized to the grid system and ready to meet electric demand within 10 minutes of a dispatch instruction by the ISO. Spinning reserve is needed to maintain system frequency stability during emergency operating conditions and unforeseen load swings.[7]

In electrical engineering, **voltage regulation** is the ability of a system to provide near constant voltage over a wide range of load conditions. Voltage regulators are an important part of power systems and power supplies.

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[5] *See* Chairman Jon Wellinghoff's testimony before the Senate Committee on Energy and Natural Resources (Dec. 10, 2009), *available at* http://www.ferc.gov/EventCalendar/Files/20091210101921-12-10-09-wellinghoff-testimony.pdf.

[6] Several thousand megawatts of solar power are proposed for development in the nearby Chuckwalla Basin and Palo Verde Valley that may offer opportunities for complimentary transmission operations.

[7] http://www.caiso.com/docs/2003/09/08/2003090815135425649.pdf - accessed May 3, 2010.

Load following is a utility's practice of adding additional generation to available energy supplies to meet moment-to-moment demand in the distribution system served by the utility, and/or keeping generating facilities informed of load requirements to insure that generators are producing neither too little nor too much energy to supply the utility's customers.

Black Start is the procedure to recover from a total or partial shutdown of the transmission system which has caused an extensive loss of supplies (brown-out or black-out conditions). This entails isolated power stations being started individually and gradually being reconnected to each other in order to form an interconnected system again. In general, all power stations need an electrical supply to start up. Under normal operations this supply would come from the transmission or distribution system; under emergency conditions Black Start stations receive this electrical supply from small auxiliary generating plant located on-site. Not all power stations have, or are required to have, this Black Start capability, but pumped storage hydropower projects have added value because they do have Black Start capability, and as such they can assist in the restoration of power to the grid in the event of a major outage.

Over-generation is a condition that occurs when power demand is less than or equal to generation. The CEC is conducting an analysis to identify solutions to integrate increasing levels of energy efficiency, smart grid infrastructure, and renewable energy while avoiding infrequent conditions of over generation. Pumped storage hydropower provides a solution for over-generation by using excess generation to pump water to the Upper Reservoir, thus storing energy for peak demand periods or when intermittent renewable generation is not available.

In general, ancillary services provided by pumped storage hydroelectric generation ensures reliability and supports the stable transmission of energy from generation sites to customer loads.

Goal and Objective #5 – Provide for Flexible Transmission Grid Operations

One additional energy system function that the Project will provide critical support for is development of the "Smart Grid," which entails operational improvements in the electrical grid to substantially improve transmission efficiency, reliability, and affordability, while fully incorporating renewable and traditional energy sources and potentially reducing carbon emissions (DOE, *The Smart Grid: An Introduction; How a smarter grid Works as an enabling engine for our economy, our environment, and our future. 2004).*

Utility scale energy storage (as proposed with the Project) provides the means for flexible grid operations to improve overall system efficiency.[8]

Energy storage benefits identified in Eyer and Corey (2010) that are critical to reliable grid operations include reserve capacity, area regulation, voltage support, load following,

[8] The DOE estimates that a 5% improvement in transmission grid efficiency nationwide would be equivalent to eliminating greenhouse gas emissions from 53 million cars. (DOE, The Smart Grid, 2004.)

transmission congestion relief, electric service reliability, avoided transmission energy losses, reduced fossil fuel generation use, and reduced air emissions from generation, among others.

Operational flexibility provided by pumped storage systems comes from the voltage regulation, ramping and load following capabilities that allow integration of renewable resources that generate during off-peak demand periods, and that naturally fluctuate in generation output as variable wind speed and cloud cover affect wind and solar energy production. These functions improve system reliability as well, by maintaining a constantly charged electrical grid, providing generation to meet peak demands, and providing “Black Start” capabilities in the event of a system failure.

Goal and Objective #6 – Reduce Greenhouse Gas Emissions

Operating a smarter grid also reduces waste (reducing GHG emissions), allows full integration of renewable energy generation sources that do not produce GHG emissions, and provides reduced GHG peak power generation by displacing traditional single-cycle natural gas peak power generation. Energy storage, and particularly at the utility scale proposed with this Project, is an essential enabling technology for these future smart grid operations and related attainment of state, national, and international environmental goals for addressing GHG emissions.

Goal and Objective #7 – Re-use Existing Industrial Site

The environmental impacts of energy generation can be minimized by siting facilities on previously disturbed sites. The Eagle Mountain Mine site is comprised of several large mining pits, and associated tailing impoundments and waste rock sites. The mine site has been denuded of vegetation and has little, if any, value to wildlife or native species. No recreational activities are allowed at the site. Iron mining was discontinued by 1983. Using this site for energy generation will limit the potential environmental impacts compared to development of a previously undisturbed site.

Goal and Objective #8 – Locate Energy Generation in Proximity to the Transmission Grid

By locating energy generation facilities in close proximity to the transmission grid, the environmental impacts of the construction and operation of transmission interconnection is minimized. In addition, shorter transmission interconnection results in reduced Project costs, ultimately benefiting rate payers.

Goal and Objective #9 – Generate Hydropower without Causing Impacts to Surface Waters and Aquatic Ecosystems

By locating the proposed Project in existing mining pits, impacts to streams, fisheries resources, wetlands, and other aquatic ecosystems are avoided. No perennial waters supporting aquatic habitat will be affected.

2.3 Applicant Proposed Project

ECE has proposed a pumped storage project that will use off-peak energy to pump water from a lower elevation reservoir to an upper elevation reservoir for storage during periods of low electrical demand, and generate energy by releasing the water from the upper reservoir through generating units and back to the lower reservoir during periods of high electrical demand, and as needed to support transmission grid operations. In general, the low demand periods are expected to be during weekday nights and throughout the weekend, and the high demand periods are expected to be in the daytime during weekdays. The Project will provide an economical supply of peaking capacity, as well as load following, system regulation through spinning reserve, and immediately available standby generating capacity.

The Project will provide 1,300 MW of generating capacity, configured with four reversible pump-turbine units of 325 MW each. The Project reservoirs will be formed by filling existing mining pits with water (Figure 2-2). The mining pits are empty and have not been actively mined for decades. The Eagle Mountain Mine's existing Central Pit will be used to develop the Upper Reservoir and the existing East Pit will be used to develop the Lower Reservoir. The elevation difference between the reservoirs will provide an average net head of 1,410 feet. The proposed energy storage volume will permit operation of the Project at full capacity for 10 hours each weekday, with 12 hours of pumping each weekday night to fully recharge the Upper Reservoir on a weekly basis, with additional pumping on weekends. The amount of active storage in the Upper Reservoir will be 17,700 acre-feet, providing 18.5 hours of energy storage at the maximum continuous generating discharge. Water stored in the Upper Reservoir can provide approximately 22,000 MWh of on-peak generation. Tunnels will connect the two reservoirs to convey the water, and the generating equipment will be located in an underground powerhouse.

A 500 kilovolt (kV) double circuit transmission line will convey power to and from the Project through an interconnection collector substation located west of the unincorporated town of Desert Center, California (Figure 2-3). System improvements and accessible power markets will be investigated during upcoming system analysis performed by the CAISO in coordination with Southern California Edison.

The Project will be located entirely off-stream in that neither the Upper nor Lower reservoirs intercept a surface water course. The reservoirs will receive only incidental runoff from surrounding slopes in a very limited watershed area within the historically mined lands, and from the ephemeral channel of Eagle Creek that was routed during the mining era into the existing East Pit that is proposed to be developed as the Lower Reservoir. Water to initially fill the reservoirs and annual make-up water will be pumped from groundwater within the adjacent Chuckwalla Valley. The Project Applicant has acquired land and attendant water rights to two properties in the Chuckwalla Valley where three new wells will be installed and connected to a central collection pipeline corridor.

The Mine Reclamation Corporation (MRC), a division of Kaiser Ventures LLC (Kaiser), intends to develop portions of the mine site for a major landfill (the Eagle Mountain Landfill or landfill).

As such, the proposed Project has been formulated with the assumption that the landfill will exist as proposed by the landfill developers. As detailed in this Draft Final EIR, the landfill and the proposed Project are deemed compatible in that neither would materially interfere with the construction or operation of the other (*see* Section 3.9 Land Use and Section 12.5 Eagle Mountain Pumped Storage Project – Landfill Compatibility). Kaiser currently owns a portion of the lands within the Project site. Whether by lease, acquisition of fee title, or otherwise, the Licensee will obtain the property rights required for Project purposes consistent with requirements of the Federal Power Act.

More details about the characteristics and description of the major features of the Project are presented in Table 2-1 below.

Table 2-1. Significant Data for Eagle Mountain Pumped Storage Project

Project Feature	Feature Data
Hydroelectric Plant	
Total Rated Capacity	1,300 MW
Number of Units	4 (Reversible)
Unit Rated Capacity	325 MW
Maximum Plant Discharge	11,600 cfs
Pump/Turbine and Motor/Generator Unit Data	
Rated Head	1410 ft
Rated Turbine Output	319 MW
Maximum Turbine Flow	2,900 cfs
Operating Speed	333.3 rpm
Generator Rating	347 MVA
Low Pressure Upper Tunnel	
Diameter	29 ft
Length	4,000 ft
Shaft	
Diameter	29 ft
Length	1,390 ft
High Pressure Lower Tunnel	
Diameter	29 ft
Length	1,560 ft
Tailrace Tunnel	
Diameter	33 ft
Length	6,835 ft
Powerhouse Cavern	
Height	130 ft
Length	360 ft
Width	72 ft
Upper Reservoir	
Dam Type	Roller-compacted
Volumes	

Project Feature	Feature Data
Total Reservoir Capacity	20,000 ac-ft
Inactive Storage	2,300 ac-ft
Active Storage	17,700 ac-ft
Operating Levels	
Minimum Operating Level	El. 2,343
Maximum Operating Level	El. 2,485
Water Surface Areas	
Water Surface Area at El. 2,343 feet	48 acres
Water Surface Area at El. 2,485 feet	191 acres
Dimensions of Dams	
Structural Heights (West and South Saddle Dams)	60 ft and 120 ft
Top Widths	20 ft (both dams)
Crest Lengths	1,100 to 1,300 ft
Crest Elevation	El. 2,490
Spillway, ogee crest elevation	El. 2,486
Spillway Width	100 ft
Spillway Channel Length	4,230 ft
Spillway Channel Elevations	El. 2,380 - 2,200
Lower Reservoir	
Dam Type	None
Volumes	
Total Reservoir Capacity	21,900 ac-ft
Inactive Storage	4,200 ac-ft
Active Storage	17,700 ac-ft
Operating Levels	
Minimum Operating Level	El. 925
Maximum Operating Level	El. 1,092
Water Surface Areas	
Water Surface Area at El. 925 feet	63 acres
Water Surface Area at El. 1,092 feet	163 acres
Spillway Ogee Crest elevation	El. 1,094
Spillway width	15 ft
Water Treatment Facilities	
Treatment Type	Reverse osmosis
Volume treated	2,055 gpm
Target water quality (Total dissolved solids)	~660 ppm
Brine ponds	56 acres
Brine quantity (annual)	270 ac-ft
Frequency of salt removal from ponds for disposal	Every 10 years
Water Supply Wells	3
Pumps	2,000 gpm 1,000 HP
Monitoring Wells	15
Seepage Recovery Wells	13

Project Feature	Feature Data
Extensiometers	2
Roads (new, all within Project site)	
To West Saddle Dam, from existing access road	0.32 mi
Elevator access road	0.36 mi
On north side of Lower Reservoir, to Lower Reservoir	0.96 mi
To South Saddle Dam, from existing access road (existing road to be improved)	0.78 mi

2.4 Detailed Description of Project Facilities & Components

Maps showing the proposed Project layout and proposed Project boundary are found in Figures 2-6 and 2-7.

2.4.1 Upper Dams and Reservoir

The Central Pit of the Eagle Mountain Mine will be used to develop the Upper Reservoir. The bottom of the pit is at elevation (El.) 2,230, and the existing low points of the rim are at El. 2,380 and El. 2,440. The active storage portion of the reservoir is planned between El. 2,343 feet and El. 2,485. The volume between these elevations is 17,700 acre-feet, and the respective surface areas are 48 and 191 acres. To obtain the required volume of storage it will be necessary to construct two dams along the perimeter of the pit. These dams are identified as the South Saddle Dam and West Saddle Dam (Figure 2-8). Because the rim of the Central Pit has sections on the west and south sides that lie below the proposed upper operating level of the Upper Reservoir, two individual dams will be constructed at the elevation of the pit rim at the bottom of those two proposed dam locations. At low point El. 2,380, a taller dam will be needed than at the other low point (El. 2,440). This design is also shown in Figure 2-8.

The dams are planned to be constructed of roller-compacted concrete (RCC) with an upstream membrane liner and foundation grouting to control seepage. The crest elevation of the dams will be El. 2,490 and the crest width will be 20 feet. The South Saddle Dam will have a height of 120 feet and a crest length of 1,300 feet. The West Saddle Dam will have a height of 60 feet and a crest length of 1,100 feet. Dam construction will require preparation of the foundation to remove any waste materials from mining, overburden, and weathered rock to expose firm, un-weathered bedrock prior to placement of dental and leveling concrete and the RCC lifts. For Project planning and based on available information, it is assumed that an average of 10 feet of excavation would be required for the foundation. Normal freeboard was assumed to be 5 feet between the normal high-water level and the dam crest. As described in Section 12.9, a spillway will protect the Upper Reservoir in the very unlikely event of overtopping during an over-pumping event and to handle surface runoff from the very small surrounding watershed area into the reservoir.

Drilling and testing of the foundation and dam and testing of RCC aggregate sources will be initial design tasks performed when access rights to the site are obtained. A study plan has been prepared describing the geotechnical evaluations that will be undertaken when site access becomes available. That study plan is found in Section 12.1.

The downstream face slope of the dam was assumed to be 0.8 (horizontal) to 1 (vertical), with no chimney section. This section is conservative based on experience and judgment with dam design in southern California. Many concrete gravity dams have steeper downstream faces and chimney sections in areas with greater seismic loads. Similar to the recently completed Olivenhain Dam in San Diego County, the upstream face of the dam would be formed with grout-enriched RCC and later covered with a membrane liner to control seepage. Seepage control is in the economic and environmental interest of the Project and will also protect the down-slope groundwater aquifer. The preliminary design concept includes a drainage gallery to accept flows from foundation drains provided to control uplift. The foundation would most likely require grouting for seepage control, and a double row grout curtain with depths equal to the height of the dam along the entire dam axis. Final design of the RCC will follow criteria established for RCC gravity dam design to comply with all requirements of the FERC and the California Division of Safety of Dams (DSOD).

Control of seepage from the Upper Reservoir will be important to minimize water losses and to limit the amount of reservoir water that could potentially reach the aquifer below the nearby Colorado River Aqueduct (CRA). Existing geologic data suggest that there is sufficient permeability of the fractured rock that underlies the Central Pit to produce seepage from the Upper Reservoir. The final design will include selection of seepage control measures for the Upper Reservoir utilizing localized grouting and shotcrete placement and potentially other methods. During final design, geologic mapping will be performed and seepage control methods will be defined with greater certainty. Further discussion of seepage potentials and seepage control measures is provided in Sections 12.5 and 12.6. Section 12.6 also details a seepage mitigation program consisting of monitoring and pump-back recovery wells.

PDFs are design elements inherent to the Project that reduce or eliminate potential impacts. PDF GW-1 includes design elements pertaining to seepage, as follows:

PDF GW-1. Groundwater Seepage.

The Licensee will limit seepage from the Project reservoirs to the extent feasible using specified grouting, seepage blankets, and roller-compacted concrete (RCC) or soil cement treatments. This includes the Upper Reservoir, Lower Reservoir, and the brine disposal ponds that will be part of the water quality management system for the Project. Final design for seepage control will be approved by the State Water Board and FERC prior to construction. Seepage control from the Project reservoirs will be accomplished using systematic procedures that will include the following:

During final engineering design, a detailed reconnaissance of the reservoir basins and pond areas will be conducted to identify zones where leakage and seepage would be expected to occur. These areas will include faults, fissures and cracks in the bedrock, and zones that may have direct connection to the alluvial deposits of the Chuckwalla Valley. During the reconnaissance, the effectiveness of various methods for seepage and leakage control to mitigate the effects of these particular features will be evaluated, including grouting, seepage blankets, and RCC or soil cement treatments, and other methods if needed.

Methods for seepage and leakage control will include curtain grouting of the foundation beneath the dam footprint and around the reservoir rim, as needed; backfill concrete placement and/or slush grouting of faults, fissures, and cracks detected in the field reconnaissance; placement of low permeability materials over zones too large to be grouted and over areas of alluvium within the Lower Reservoir; seepage and leakage collection systems positioned based upon the results of the hydrogeologic analyses; and clay or membrane lining of the brine ponds associated with the Project's water quality management system. The collection systems would recycle water into the Project reservoirs or the reverse osmosis (RO) system.

Design and construction of a Comprehensive Monitoring Program, consisting of observation wells and piezometers that will be used to assess the effectiveness of the seepage and leakage control measures.

Based on monitoring results, additional actions may be taken to further control leakage and seepage from the reservoirs and ponds. Such measures may include curtain grouting and the expansion of seepage and leakage collection systems.

Other measures, such as use of stepped RCC or soil cement overlay on the eastern portion of the Lower Reservoir, may also be used depending on results of final engineering design analyses.

In addition, portions of the tunnels and shaft of the Project will experience very high water pressures; whereas, current plans are based on lining of the tunnels with concrete, and in some locations steel liners will be installed. These liners will also effectively block seepage from occurring.

An excavated approach channel to the inlet/outlet (I/O) structure at the east end of the reservoir will have a bottom width of 100 feet and side slopes of 0.5 horizontal to 1.0 vertical. The approach channel will have an invert at El. 2,287 and slope down to the tunnel invert at El. 2,282. The I/O structure will have a trashrack with a gross area that is about 84 feet wide by 60 feet high. Three piers within the flared portion of the I/O structure will assist in spreading flow uniformly over the trashrack area in the pumping mode. The Upper Reservoir I/O structure will be equipped with a fixed-wheel gate for emergency closure and tunnel inspection. The I/O structure in the Upper Reservoir will be a reinforced concrete gravity structure founded on competent bedrock.

The slopes above the maximum normal reservoir pool (El. 2,485) will be evaluated relative to their stability under normal and earthquake loading conditions. Slope stabilization measures may be required to prevent a slide of material into the reservoir that could result in loss of storage and/or overtopping of the dams. These measures could include: flattening of slopes; rock-bolting of unstable zones, if found; and placement of shotcrete or rock fencing.

The entire Upper Reservoir area will be fenced and gated to prevent the entry of unauthorized personnel and the public both during and after construction. (Fencing for wildlife exclusion purposes is also proposed as described in Section 3.5 Biological Resources.)

Access to the dams and reservoir will be by improved roads planned as part of the landfill operation (but that will be built initially for this Project) and by new 30-foot-wide gravel roads constructed from the landfill road to the Project features.

2.4.2 Lower Reservoir

The East Pit of the Eagle Mountain Mine will be developed to form the Lower Reservoir for the Project. The bottom of the pit is at El. 740, and the existing low point of the rim is at El. 1,100. The active portion of the reservoir is planned between El. 925 and El. 1,092. The volume between these elevations is 17,700 acre-feet, and the respective surface areas are 63 and 163 acres. The entire active reservoir volume can be contained within the pit; therefore, construction of dams will not be necessary to create the Lower Reservoir (Figure 2-8).

Seepage potential from the Lower Reservoir is expected to be more significant than from the Upper Reservoir because the east end of the mine pit is in alluvial material. Studies conducted by Kaiser and MRC (1991) [in EMEC, 1994] indicated that the horizontal permeability of these alluvial deposits is relatively high (EMEC, 1994). Multiple seepage control measures may be required. Detailed geologic mapping will be performed once site access is obtained in order to identify areas where provision of a seepage blanket will be effective. This blanket will be comprised of fine tailings from the mining operation placed on the bottom and flat areas of the reservoir. Depending upon the impermeability of this material, it may also be necessary to top it with a layer of the finer tailings from the nearby fine tailings ponds or to mix the tailings with imported clay materials (e.g., bentonite) to further reduce permeability. In addition to this general blanketing at the eastern end of the pit, some localized blanketing may be required at other locations in the Lower Reservoir. Also, grouting and shotcrete placement may be required following identification of high permeability zones. Other seepage control options that may be explored during design include interior slope modifications and placement of RCC or soil cement over the areas with greatest seepage potentials.

To support final engineering design, geologic mapping will be performed and seepage control methods will be defined with greater certainty for the Lower Reservoir. In addition, as discussed in Section 12.6, a seepage mitigation program consisting of monitoring and pump-back recovery wells will also be employed to ensure that seepage does not impact down-gradient groundwater or the CRA.

The I/O structure at the Lower Reservoir will be located near the west end of the reservoir and will be constructed in the sloping bank of the pit. The I/O structure approach channel will have an invert at El. 862 and slope down to the tunnel invert at El. 857. The structure will have a trashrack with a gross area that is about 84 feet wide by 60 feet high. A fixed-wheel gate will provide for emergency closure and for tailrace tunnel inspection. The I/O structure in the Lower Reservoir will be very similar to the one planned for the Upper Reservoir and will be a reinforced concrete gravity structure founded on competent bedrock.

The entire Lower Reservoir area will be fenced and gated to prevent the entry of unauthorized personnel and the public during construction and operation. Fencing for wildlife exclusion purposes is also proposed. Wildlife fencing is discussed in more detail in Section 3.5 of this Draft Final EIR.

The slopes above the maximum normal reservoir pool (El. 1,092) will be evaluated relative to their stability under normal and earthquake loading conditions. Based on these analyses, slope stabilization measures may be required to prevent a slide of material into the reservoir that could result in loss of storage and/or overtopping of the dams. These measures could include: flattening of slopes; rock-bolting of unstable zones, if found; and placement of shotcrete or rock fencing.

Access to the reservoir will be by improved roads planned as part of the landfill operation and by new 30-foot-wide gravel roads constructed from the landfill road to the Project features. Access will be afforded to the crests of each Upper Reservoir by gravel roads.

2.4.3 Spillways

The release system from the Lower Reservoir is proposed to be an overflow spillway and a channel from the southeast rim of the Lower Reservoir across mine property and the CRA. This channel would terminate beyond the CRA and flows would spread laterally at shallow depths over the alluvial fan. For Project planning, the Lower Reservoir spillway is assumed to be 15 feet wide, with an ogee crest at El. 1,094. The ogee crest will have an approach depth of 5.6 feet, and varying height sloped side walls. With the reservoir at El. 1,098, the spillway will discharge approximately 460 cubic feet per second (cfs). The Lower Reservoir Spillway Channel will be about 6,665 feet long and descend from approximately El. 1,088 to approximately El. 985. The Lower Reservoir Spillway Channel was modeled using the USACE HEC-RAS computer program to estimate the required size and velocities within the channel. The Lower Reservoir Spillway Channel will transition from the 15-foot-wide ogee crest with vertical side walls to a 10-foot-wide, minimum 5-foot-high, 2H:1V side slope channel in approximately 250-feet. The first 250 feet will be a concrete-lined channel, and the remaining portion of the channel will be lined with riprap. If the probable maximum flood (PMF) volume (11,520 acre-feet) is stored in addition to the water used for energy storage, it will be necessary to change the normal pumped-storage operating procedures to cause this excess water to be spilled. With the Lower Reservoir spillway described, the excess PMF volume could be released over an extended period of 305 hours (13 days).

A spillway will be provided for the Upper Reservoir at the South Saddle Dam. This spillway will handle any excess water that cannot be stored during the inflow design flood, which will be the PMF, and will also provide for protection of the dam if over-pumping should occur. Because the reservoirs are both off-channel and the reservoir volume used for generation is fixed, the potential for an over-pumping event causing over-topping of the Upper Reservoir dam is extremely small. Also, the RCC dams of the Upper Reservoir could be overtopped without causing dam failure. An overflow spillway with a crest length of 100 feet will be provided to pass approximately 3,120 cfs with a water surface at El. 2,489. This capacity will handle routing of the PMF and also provides capacity somewhat greater than the pumping capacity of one turbine unit. The storage capacity between El. 2,485 and the dam crest would provide 2 hours of storage for the full pumping discharge.

The spillway will be integral with the South Saddle Dam and consist of a formed ogee crest with an approach depth of 10 feet, and 4 feet high vertical side walls that transition to the stepped RCC downstream face of the dam where considerable energy dissipation will occur. At the toe of the dam a USBR Type III Stilling Basin will be constructed to dissipate the remaining excess energy of the flood flows. The stilling basin will be 100-feet wide, approximately 30-feet long, and have 12.5-feet high basin side walls. The basin floor will be set approximately at El. 2,380, and transition to the spillway channel. The Upper Reservoir Spillway Channel will be about 4,230-feet-long and descend from approximately El. 2,380 to approximately El. 2,200, where flows will discharge into Eagle Creek. The Upper Reservoir Spillway Channel was modeled using the USACE HEC-RAS computer program to estimate the required size and velocities within the channel. The Upper Reservoir Spillway Channel will transition from the 100-foot-wide vertical side wall stilling basin at the dam toe to a 20-foot-wide, 10-foot-high, 2H:1V side slope channel over a distance of approximately 500 feet. The first 500 feet will be concrete-lined channel, and the remaining portion of the channel will be provided with armoring to protect against high velocities or energy dissipation structures to reduce velocities and protect against scour and erosion. The Upper Spillway Channel will cross an existing road in two locations and then the spillway channel flows will be discharged into Eagle Creek. Water from the spillway channel will reach the Lower Reservoir via Eagle Creek channel, which is routed to the Lower Reservoir.

2.4.4 Conduits

A system of water conductor tunnels will convey water from the Upper Reservoir to the underground powerhouse and from the powerhouse to the Lower Reservoir in the generating mode (Figure 2-8). Flow will be reversed in the pumping mode of operation. From the Upper Reservoir I/O structure, an upper ("low head") pressure tunnel will extend 3,963 feet to a 1,348-foot-deep vertical shaft connecting the upper tunnel to the lower ("high head") tunnel; the lower pressure tunnel will extend 1,563 feet to a 35-foot-long penstock manifold; and four penstocks will extend approximately 500 feet to the turbine inlet valves at the powerhouse. From the powerhouse, the four individual tailrace tunnels will extend approximately 350 feet through a tailrace manifold, and the main tailrace tunnel will extend 6,635 feet from the manifold to the Lower Reservoir I/O structure.

The upper pressure tunnel and the main tailrace tunnel will be excavated by tunnel boring machine (TBM). The finished tunnel diameter for the upper pressure tunnel will be 29 feet. For planning, it was assumed that the upper tunnel will be concrete lined; however, depending on rock quality, the upper tunnel may be not be lined throughout its entire length. A concrete-lined manifold will connect the lower pressure tunnel to the penstocks. The four penstocks will be completed to a finished diameter of 15 feet and will be steel lined. The four tailrace tunnels upstream of the concrete-lined tailrace manifold will be completed to a finished diameter of 16 feet. These tunnels will be concrete lined. The main tailrace tunnel from the manifold to the Lower Reservoir will be completed by TBM or drill and blast methods. This tunnel will be shotcrete lined to a finished diameter of 33 feet.

The penstock lining steel is designed to be ASTM A537, Class 1, with yield strength of 50,000 pounds per square inch (psi) and a design stress with normal pressure rise of 37,500 psi. The resulting thickness will be 1.625 inches. External pressure on the lining will be controlled with drains extending from a grout curtain at the end of the steel lining farthest from the powerhouse to the powerhouse cavern, with provisions for reaming out deposits in the future. Steel linings will be backfilled with concrete and low pressure grouted.

The penstock and tailrace manifolds will be concrete lined, as will portions of the individual penstocks and tailrace tunnels that are not steel lined. Just downstream of the tailrace manifold there will be a rock trap to collect rock spalls and prevent them from reaching the pump-turbines from downstream direction. Access to the rock traps for cleaning will be through a bulkhead door in a plugged section of a construction access tunnel.

Surge control facilities will be provided upstream and downstream from the powerhouse. The upstream surge chamber will be an enlargement of the vertical pressure shaft to a diameter of 90 feet. The surge chamber portion of the shaft will extend from El. 2,270 to the ground surface at El. 2,515 feet. The surge chamber will have a restricted orifice entrance to balance the transient pressure rise. The tailrace surge chamber will consist of two horizontal tunnels, each 550-feet-long, connected with a shaft, which continues to a connection with the main tailrace tunnel immediately above a rock trap. The tunnels will be 26-feet-wide by 26-feet-high and horseshoe shape, and the shaft will be 12 feet in diameter. Both the tunnels and the shaft will be concrete lined. Air admission and release to and from the tailrace surge chamber will be through an air shaft extending to the ground surface outside of the landfill boundary. The tailrace surge chamber will also have a restricted orifice below the lower tunnel.

The surge tank shaft will open to the atmosphere and will day-light into a rock cut. The slope will be excavated and benched to be stable. Rockbolts and shotcrete will be used to assure long-term slope stability. If needed, a rock-retaining fence or rock-retaining concrete wall will be placed around the perimeter of the shaft.

Waste rock from tunnel boring will be used to meet construction needs; such as for road base for access roads, miscellaneous backfills for access roads and around structures, flood berms, and potentially for RCC in the dams. Any excess material will be placed in the reservoirs or spoiled in areas from which fine tailings have been removed. The volume of waste rock is estimated to be 1,772,000 cubic yards (CY), which is equivalent to 1,100 AF unless materials are compacted where they are disposed. If materials are compacted, the volume is 1,541,000 CY (955 AF). The Upper Reservoir has 2,300 AF of dead storage; the Lower Reservoir has 4,200 AF of dead storage which can be used for disposal of excess waste rock.

2.4.5 Powerhouse

The powerhouse cavern will be located underground approximately 6,300 feet from the Upper Reservoir and 7,200 feet from the Lower Reservoir. The pump/turbine centerline will be at El. 770 feet. The cavern will be sized to accommodate four 325 MW units. The cavern will be approximately 72-feet-wide, 150-feet-high, and 360-feet-long. A separate transformer gallery, a short distance downstream from the powerhouse, will be approximately 46 feet-wide, 40 feet-high, and 400 feet-long.

The powerhouse substructure and superstructure will be constructed of cast-in-place reinforced concrete. The pump/turbine spiral cases will be permanently embedded in second-stage concrete. Floors will be supported with concrete walls and columns. Walls will also serve to partition areas. Substructure and superstructure configurations will be dictated by final mechanical and electrical equipment arrangements. The transformer chamber, located downstream from the powerhouse chamber, will be located above the tailrace manifold and connected to the powerhouse by the main access tunnel.

Suspended corrugated metal panels supported from steel trusses will extend the length of the machine hall. The false ceiling will protect against possible water seepage and rock falls. A drain system will be provided around the powerhouse walls to carry collected seepage to the powerhouse drainage sump pit.

An unloading and erection bay will be located at one end of the unit bays, accessed by the main access tunnel. Space for the control room, workshop, office, and personnel-related space will be located in the two upper levels at the end of the cavern adjacent to the erection bay.

The major equipment will be handled by two 300-ton bridge cranes that will run on rails the length of the unit and erection bays. Floor hatches will be provided for moving other equipment between floors. The turbine inlet valves will be handled with the main crane. The transformers will be moved into place on transfer rails. The draft tube gates will be installed and maintained using a dedicated under-hung bridge crane.

Personnel movement within the underground chambers will be by elevators and stairs, the locations and dimensions of which will be decided during final Project planning and design.

2.4.6 Access Tunnel

Access to the underground powerhouse will be through the main access tunnel. This will be a vehicular tunnel that is 28 feet wide and 28 feet high. The tunnel portal will be southeast of the powerhouse. The invert elevation at the portal will be approximately 1,100 feet, and it will enter the powerhouse at El. 808 feet. The length will be approximately 6,625 feet and the slope 4.4 percent. The tunnel will be shotcrete lined and will have a concrete roadway on the invert. Rockbolts or other rock support will be used as required where areas of weak or broken rock are encountered. The top portion of the tunnel will carry a powerhouse and tunnel ventilation duct.

2.4.7 Other Structures

A switchyard (Project Connection Point) will be located about 4,500 feet south of the powerhouse, outside the boundaries of the proposed future landfill. It will be located on a level site at an approximate El. 1,430 feet. It will be 500 by 1,100 feet, with a gravel surface. This area will be surrounded by a security fence. A security and maintenance lighting system will be provided. It will also be designed to protect against bird electrocution if appropriate.

This switchyard will be connected to the underground powerhouse via cables from the transformer gallery to the access tunnel portal and overhead as overhead lines from the portal to the switchyard. The high-voltage cables will run inside the length of the access tunnel to a shaft located near the Lower Reservoir inlet structure. Here the transmission lines will come up through the shaft to the ground surface. At the ground surface they will follow the upper edge of the Lower Reservoir as overhead transmission lines to the southwest, connecting to the switchyard. The overhead lines will terminate in the switchyard and be connected through protective breakers and associated switches to a double circuit 500 kV transmission line. The switchyard will contain all necessary disconnect switches, protective equipment and metering equipment.

A fenced area near the access road to the access tunnel portal will contain a storage warehouse building and an administration building. Bottled water for drinking will be provided to Project staff. Sewage disposal will be provided in a properly permitted septic system, incineration, or off-site disposal. Composting toilets may be used in the underground powerhouse, and potentially at the administration building as well.

While the primary powerhouse access will be through the main access tunnel described above, safety requires a second means of personnel egress from the underground facilities. This normally would be an elevator shaft from the ground surface directly above the powerhouse. However, to accommodate the landfill development, this access shaft will be provided approximately 800 feet north and west of the powerhouse with connection of this shaft to the powerhouse by a short, curved tunnel section. The elevator shaft would be approximately 1,100-feet-deep and 9 feet in diameter extending to the erection bay floor at El. 808. The tunnel section would be approximately 800 feet long with a 14-foot horseshoe section similar in design to the main access tunnel except smaller in size.

Access to Eagle Mountain Pumped Storage Project facilities will be in part by the roads that were developed for the mining operations and which are planned to be improved for servicing the landfill. The primary access road will be the existing Kaiser Road, which is a public county road. No new road crossings of the CRA will be required.

In addition to these roads, new access roads will be constructed to provide access to the Upper Reservoir dams, both I/O structures, the upper surge chamber and the access tunnel portal, and storage/administration area. The road to the access tunnel portal and the storage/administration areas will be paved with asphaltic concrete; the other roads will be gravel surfaced.

2.4.8 Water Supply and Conveyance Pipelines

Water to initially fill the reservoirs and annual make-up water will be pumped from groundwater within the Chuckwalla Valley. Three wells will be utilized to provide initial reservoir fill. Water to replace losses due to seepage and evaporation will be obtained from the same source. The new wells will be connected to a central collection pipeline corridor.

The locations of the three groundwater wells are approximately 11 miles southeast of the Project area (Figure 2-3). The proposed groundwater supply well system consists of the following main components:

- Three 1,000 horsepower (HP) vertical turbine pumps capable of pumping up to 2,000 gallons per minute (gpm)
- 1.3 miles of 12 inch-diameter well field collection pipe
- 3.3 miles of 18 inch-diameter well field collection pipe
- 10.7 miles of 24 inch-diameter conveyance pipe

Upon completion of the initial fill, one well will have adequate capacity to replenish water lost to evaporation and seepage. A second well will be maintained as a backup water supply for the makeup water needs.

The Project Applicant has identified specific project feature elements to reduce or eliminate potential environmental impacts. These project design features (PDFs) are incorporated into the Project, either in the Project design or by regulatory law as part of Project implementation. These features are identified with a numeric identifier. Two project design features that has been incorporated into the Project to reduce environmental impacts from water pipeline construction are:

PDF LU-3. **Pipeline Construction.** Impacts from water pipeline construction will be minimized or avoided by (1) grading out the sidecast to meet existing grades; (2) minimizing disturbance, construction timing to avoid seasonal rain, and maintaining surface contours and natural function of washes crossed; and (3) use of existing access roads, when feasible, thereby avoiding new ground disturbance.

PDF LU-5. **Public Outreach Program.** The Applicant will hold public meetings in the Project area to brief the public on project activities and to hear and respond to comments. These meetings will be held quarterly in the Project area during engineering and construction and annually during Project operation for the life of the Project.

2.4.9 Reverse Osmosis System

In order to maintain water quality (primarily salinity) within the reservoirs, a water treatment system will be required to remove certain constituents from the reservoir water supply. This facility would treat the make-up water supply to the reservoir system. The design of the treatment facility comprises several pretreatment steps to ensure that the stored surface water is suitable for treatment by the reverse osmosis (RO) process, which will provide for the bulk of the salt concentration. Treated water will be returned to the Lower Reservoir while the concentrated brine from the RO process will be directed to evaporation ponds. The treatment goal will be to maintain water quality levels in the reservoirs comparable to the input groundwater quality.

Water quality data from wells in the Chuckwalla Aquifer were used to make assumptions about the source water quality. While the total replacement water need is estimated to be 2,360 acre-feet per year for evaporation and seepage, only the evaporation component (1,760 acre-feet per year) enters into the estimation of water treatment requirements. The RO treatment system would remove water from the Upper Reservoir at a rate of 2,055 GPM and remove sufficient total dissolved solids (TDS) to maintain the in-reservoir TDS at the same average concentration of the source water. The specific treatment process steps are: (1) energy recovery turbine, (2) dissolved air floatation, (3) automatic strainers, (4) microfiltration, (5) reverse osmosis, and (6) brine concentration.

A dissolved air flotation (DAF) unit is provided as the first step in the desalting process. The DAF is a clarification process, provided to treat water from the reservoir for turbidity and suspended solids control. The DAF is particularly efficient in removing algae, which could otherwise be a potential problem in the reservoir system. The DAF works by passing a portion of the feed stream through an air saturator where it becomes saturated with air at high pressure. This stream is then mixed with the balance of the feed water in the flotation portion of the tank. The release of pressure generates bubbles which rise to the surface carrying with them suspended solids including algae. The DAF process can be improved by the addition of coagulants, commonly iron salts or polymers.

The two automatic backwash screens provide protection for the microfiltration (MF) system, which removes fine particles. The filtered water is pumped through the RO membrane system. The microfiltration system will consist of two 50 percent capacity treatment trains in parallel. The MF systems consist of hollow fiber membranes contained in housings, with multiple of these housings connected in parallel to provide the required membrane area. Filtered water leaves the MF units and is stored in a filtered water tank located just outside of the process building.

The operation of the MF systems involves the following major process steps:

1. Normal filtration where the feed water passes from outside to inside the membrane fibers. Filtered water is collected from each module in the unit and flows into the filtered water tank.
2. Backwash or reverse filtration occurs on a predetermined cycle typically every 15 to 30 minutes. During backwash, normal filtration for one unit or part of the unit is interrupted and filtered water is passed from the filtrate side of the membrane to the outside dislodging suspended solids which have collected during the filtration cycle. In addition, during the backwash cycle air is introduced to the outside of the fiber bundle to scour the fibers to improve backwash efficiency. After backwash, which typically takes 2 to 3 minutes, the unit returns to normal filtration.
3. Maintenance Wash. On a daily basis the membranes are exposed to a hypochlorite solution to minimize biological growth and otherwise reduce membrane fouling. A waste stream of hypochlorite solutions is therefore produced daily that can be returned to the reservoirs.
4. Chemical Cleaning. On an infrequent basis (typically 45 to 60 days) the membranes are cleaned with more aggressive chemical cleaners including caustic solutions, detergents and dilute acids. These cleaning solutions will be neutralized and disposed of in a properly permitted on-site septic system or removed for disposal at an approved disposal site.

The individual membrane modules are connected together in manifold fashion forming individual MF trains. The membranes will be configured vertically in this instance. Two parallel membrane trains will be located inside the treatment building. The auxiliary equipment including feed pumps, backwash pumps and membrane cleaning equipment will also be installed inside the membrane building. Filtered water from the filtered water tank is pumped through a set of cartridge filters to the RO feed pumps where it is further pressurized to provide feed to the RO vessels.

The RO concentrate, containing the bulk of the salts removed from the reservoir system, would be processed to dry salt in an evaporation pond or ponds. From the overall material balance, the total brine to be evaporated is approximately 170 gpm or 270 acre-feet per year. This converts to a pond of about 56 acres. The proposed design for the evaporation pond divides the total required pond area into six varying level salinity ponds and five solidifying ponds. Each salinity pond will be about 8.3 acres in size, and each solidifying pond will be about 1.4 acres in size. The RO concentrate would flow into one pond and then be directed to another pond while the solution remaining in the first pond evaporates. Typical pond design includes 8-foot berms with double liners to prevent seepage. Monitoring wells would be installed to identify a potential liner failure. The owner will be required to prepare a Report of Waste Discharge (ROWD), to comply with requirements of Title 27 of the California Code of Regulations,[9] for permitting of the brine ponds. The ROWD will include details of the proposed liner and monitoring facilities and is required to be submitted during final engineering for the Project.

Over a period of years, the salt level in the ponds will rise and salts would need to be mechanically removed from the ponds. Based on the pond size and the salt balance, the estimated rate of salt build up is 0.25 to 0.5 inches per year. Salt removal would be expected to occur on the order of once every 10 years, at which time the pond liners will be inspected and repaired or replaced as needed.

To summarize, water quality in the Project reservoirs will be protected with a RO water treatment plant. The RO treatment plant will maintain water quality levels in the reservoirs comparable to the existing groundwater quality. Treated water will be returned to the Lower Reservoir while the concentrated brine from the RO process will be directed to brine ponds. In addition to removing salts from the water supply, other contaminants (including nutrients and minerals), if present, would be removed as well. Therefore, no eutrophication will occur as the water quality in the reservoirs will be maintained. The water treatment facility is also referred to as **PDF GW-2** in this document.

PDF GW-2 Water Treatment Facility.

In order to maintain TDS at a level consistent with existing groundwater quality, a water treatment plant using a RO desalination system and brine disposal lagoon will be constructed as a part of the Project to remove salts and metals from reservoir water and maintain TDS concentrations equivalent to the source groundwater.

Treated water will be returned to the Lower Reservoir while the concentrated brine from the RO process will be directed to brine ponds. In addition to removing salts from the water supply, other contaminants, nutrients, and minerals, if present, would be removed, preventing eutrophication from occurring.

Salts from the brine disposal lagoon will be removed and disposed of at an approved facility when the lagoons become full, approximately every 10 years. The lagoons will be maintained in a wetted condition, to maintain air quality in the Project area.

2.4.10 Transmission Lines

Power will be supplied to and delivered from the Project by one double circuit 500 kV transmission. The applicant proposed route will extend approximately 13.5 miles from the Project switchyard to a proposed new Interconnection Collector Substation for interconnection to

[9] *See* Cal. Code Regs. tit. 27, § 21710 (2009).

the planned Devers -Palo Verde No. 2 transmission 500-kV line owned by Southern California Edison. The new applicant proposed Interconnection Collector Substation will require an estimated total area of 25 acres. This facility will be located near Desert Center, California.

The typical right-of-way (ROW) for the transmission line will be about 200 feet. However the ROW width can be reduced in specific locations to mitigate potential impacts to resources (e.g., adjacent land restrictions, existing roads and highways, and biological and cultural resources). The total ROW area is estimated to be approximately 611.8 acres. Additional proposed transmission line facilities and communication facilities are summarized in Table 2-2.

Cables from the powerhouse transformer chamber to the switchyard will run from each of the four 500/18 kV, 135 Mega Volt Ampere transformers through the access tunnel and then above ground on towers to the switchyard. The total length of each cable will be approximately 10,000 feet, and each will be rated as indicated for the transformers. The cable runs in the tunnel will be approximately 6,000 feet long and above ground the length will be approximately 4,000 feet.

Table 2-2 Summary of Proposed Transmission Line Facilities and Communication Facilities

Transmission Line Facilities (500 kV, double circuit)

• Conductors: Two, three-phase AC circuit consisting of three 1.5-inch to 2-inch ACSR conductors per circuit.
• Minimum Conductor Distance from Ground: 35 feet at 60°F and 32 feet at the maximum operating temperature.
• Shield Wires: Two ½ to ¾-inch-diameter wire(s) for steel lattice.
• Transmission Line Tower Type:
    - Steel Lattice Tower along entire route.
    - Structure Heights (approximate): 175 to 235 feet.*
• Average Distance between Towers: 1,056 feet.*
• Total Number of Towers (approximate): 54-68.*

Communications Facilities
• Systems: Digital Radio System, microwave, VHF/UHF radio, fiber optic cable. • Functions: Communications for fault detection, line protection, SCADA, and two-way voice communication.

Note: The exact quantity, height and placement of the towers depends on the final detailed design of the transmission line and route, which is influenced by the terrain, land use, need to cross or span other existing features, and economics.

PDF BIO-4. Avian Protection of Transmission Line.

The Licensee will develop an avian protection plan in consultation with the USFWS. The plan will: meet Avian Power Line Interaction Committee/Fish and Wildlife Service (APLIC/FWS) guidelines for an avian protection plan: present designs to reduce potential for avian electrocution and collisions; provide methods for surveying and reporting Project-related raptor mortality and managing nesting on the proposed transmission lines; and include a workers education program.

The raptor-friendly transmission lines will be developed in strict accordance with the industry standard guidelines set forth in *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006*, by Avian Power Line Interaction Committee, Edison Electric Institute, and

Raptor Research Foundation and the USFWS-approved Avian and Bat Protection Guidelines. The design plan (filed for FERC approval) will include adequate insulation, and any other measures necessary to protect bats and raptors from electrocution hazards.

2.4.11 Public Lands within the Project Boundary

The applicant proposed Project will occupy 2,364.0 acres of land (Table 2-3). Land ownership of the various features of the Project includes patented or privately owned lands (52 percent of the Project site) not directly under BLM stewardship. The rest are lands managed by the BLM under the "Limited" Class "L" MUC designation or Class "M" moderate use MUC designation. Table 2-3 presents a tabulation of the land acreage within the Project boundary. The table identifies the acreage of federal lands based on the current ownership status of the lands. A portion of the federal lands are proposed to be exchanged for private lands, currently owned by Kaiser. If the land exchange between the BLM and Kaiser is effectuated, the amount of federal land this Project will affect is decreased to 696.1 acres.

Table 2-3 Summary of Land Ownership within the Project Boundary

Land Owner	Water Supply Line Acreage	Transmission Line Acreage	Central Project Area Acreage	Total Acreage	Percent
Bureau of Land Management	84.80	537.41	73.84	696.1	29.4%
Private land (Exchanged with Bureau of Land Management and subject to litigation)	22.00	35.68	379.01	436.7	18.5%
State	0.00	0.00	0.00	0.0	0.0%
Private – MWD	24.69	38.56	4.62	67.9	2.9%
Private – other ownership	120.78	0.16	1042.46	1163.4	49.2%
Total Acreage	252.3	611.8	1499.9	2364.0	100.0%

2.4.12 Pre-construction Biological Surveys

Several biological project design features have been included in Project design to insure that Project construction has a minimal impact on special wildlife and plant species.

PDF BIO-1. **Pre-construction Special-Status Species and Habitat Survey.** Following licensing and access to the Central Project Area, surveys for special species and habitats that could support special species will be conducted. A thorough examination of the Central Project Area and local springs and seeps will provide information to determine if any avoidance or adaptive management is required. Simultaneously, the site will be assessed for use by other wildlife. Based on the results of these surveys, the biological mitigation and monitoring program will be modified in ongoing consultation with the United States Fish and Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW).

Reporting requirements for the pre-construction surveys are specified in MM BIO-2.

PDF BIO-2. **Pre-construction Plant Survey.** Preconstruction surveys will identify special-status plant populations and also species protected by the California Desert Native Plants Act (CDNPA). For annuals or herbaceous perennials that are dormant during certain seasons, data from 2008, 2009, and 2010 surveys will be used to assist in locating populations during dormant seasons. Based on these combined surveys, avoidance areas in construction zones will be established for special plant resources. The perimeters will be marked with wooden stakes, at least 3 feet high, and no more than 10 feet apart. Each stake will be flagged with red and white candy-striped flagging or other obvious barrier tape.

Where avoidance is not feasible, and the species can be reasonably transplanted (e.g., foxtail cactus, Wiggins' cholla, other cacti and species protected by the CDNPA), plants will be salvaged and transplanted in areas approved in the Re-Vegetation Plan. Transplantation will be part of the Re-Vegetation Plan developed for the Project. Salvaging seed and replanting may be an option considered for certain species (e.g., smoke tree, ironwood).

PDF BIO-3. **Pre-Construction Mammal Surveys.** Prior to construction, surveys will be conducted for all burrows that might host a badger or kit fox. (These surveys can be simultaneous with those for desert tortoise burrows.) Active burrows and all fox natal dens will be avoided, where possible. The perimeters of all avoidance areas will be marked with wooden stakes, at least 3 feet high, and no more than 10 feet apart. Each stake will be flagged with red and white candy-striped flagging or other obvious barrier tape.

Where avoidance is infeasible, occupancy of burrows will be determined through fiberoptics and/or night vision equipment. All occupants will be encouraged to leave their burrows using one-way doors, burrow excavation in the late afternoon/early evening (to encourage escape at night), or other approved methods. All burrows from which badgers or foxes have been removed will be fully excavated and collapsed to ensure that animals cannot return prior to or during construction.

2.4.13 Site Investigations

PDF GEO-1. **Subsurface Investigations.** Detailed investigations to support final engineering will be conducted in two stages, as detailed in Section 12.1. These generally include::

Phase I Site Investigations: Based on available information and the current Project configuration, conduct a limited field program designed to confirm that basic Project feature locations are appropriate and to provide basic design parameters for the final layout of the Project features. Phase I Site investigations will be initiated after licensing and receipt of site access, at the initiation of the Project engineering design phase. Field work will be completed within 6 months of the start of field investigations, and results filed with the State Water Board and FERC 12 months after the start of field investigations. Phase I field work is focused on the pumped physical facilities associated with the pumped storage project to provide the Licensee with additional information needed to confirm feasibility and Project cost.

Phase II Site Investigations: Using the results of the Phase I work, and based on any design refinements developed during pre-design engineering, conduct additional explorations that will support final design of the Project features and bids for construction of the Project. The Phase II program will also include field investigations and modeling to support detailed evaluation of potential seepage from the Project features (reservoirs and water conveyance tunnels). Seepage evaluations will include groundwater modeling to refine plans for seepage control, seepage recovery, and monitoring as required to avoid potential adverse impacts on the local ground water regime and water quality, the Colorado River Aqueduct and the proposed landfill if and when it is implemented. It should be noted that the Phase II program may be implemented in a number of progressive steps. Geotechnical field programs during the design stage of implementation are usually implemented in a phased or step-wise manner with subsequent field work planned based on what is learned from the preceding field work.

The scopes of the Phase I and II programs are discussed in a technical memorandum found in Section 12.1.

PDF GEO-2. During site investigations, geologic mapping will be performed by Project engineers to identify conditions of the overburden and bedrock exposed in the mine pits (reservoir areas) that may affect the stability of existing slopes during reservoir level fluctuations. Mapping will identify the degree and orientation of jointing and fracturing, faulting, weathering, and the dimensions of the benches excavated during mining. The apparent stability of the cut slopes and benches will be assessed at this time.

Geologic mapping will begin during the Phase I Site Investigations (See Section 12.1 and will continue during Phase II Site Investigations.

During construction, areas within the pits that exhibit unstable slopes because of adverse fracture sets exposed in the pit walls will be scaled of loose rock and unstable blocks. Material scaled from the side slopes will be removed and disposed of outside the pit, or pushed downslope and buried in the bottom of the pit. Rock slopes within the East and Central Pits that lie below an elevation of 5 feet above the maximum water level will be scaled of loose and unstable rock during construction. Existing cut slopes that lie above these elevations will not be modified unless there is evidence of potential failure areas that could impact Project facilities. Final project design will be reviewed by the State Water Board and approved by the FERC.

2.4.14 Construction Staging

PDF AES-1. Staging areas and areas needed for equipment operation, material storage and assembly shall be combined with construction lands to the extent feasible, and organized to minimize total footprint needed. Staging, storage, and temporary construction areas shall be reclaimed as soon as the use of each such area is completed.

PDF LU-1. Construction access to/from the substation site will be from the Eagle Mountain Road exit and follow the Frontage Road east to the site. The Contractor will be responsible for monitoring construction access points.

PDF LU-2. Two weeks prior to beginning construction, notices shall be posted locally stating hours of operation for construction near the Desert Center community and along State Route 177.

PDF LU-5. Public Outreach Program. The Licensee will hold public meetings in the Project area to brief the public on Project activities and to hear and respond to comments. These meetings will be held quarterly in the Project area during engineering and construction and annually during Project operation for the life of the Project.

2.4.15 Land Use

PDF LU-4. Coordination with Adjacent Projects.

The Project layout has been modified to eliminate conflicts with existing and proposed land uses. For example, construction staging and lay-down areas have been relocated to a parcel southwest of the Lower Reservoir and outside of the proposed landfill to eliminate conflict with the proposed landfill truck marshalling and railyard facilities. Low voltage cables from the underground powerhouse have been routed through the underground powerhouse access tunnel to avoid conflicts with landfill Phase 3. Water treatment facilities have been relocated further from the Colorado River Aqueduct (CRA) to address concerns of the Metropolitan Water District of Southern California (MWD) regarding the proximity of the brine ponds to the CRA.

These efforts will continue during the final design and construction of proposed Project. Because several large and complex projects are proposed in the same general area (including the landfill project and several proposed solar energy projects), detailed coordination will occur as the Project progresses in order to eliminate conflicts of facility locations, supporting infrastructure, designs, permits, and operations. The Licensee will be required to have regular project coordination meetings with the owners of the landfill project, the adjacent solar projects, MWD, and any other interested landowners and project developers during construction of the Project. As the Project progresses into the design phase, the Project layout will be designed to preserve landfill capacity in Phases 1 through 4.

PDF LU-5. Public Outreach Program.

The Licensee will hold public meetings in the Project area to brief the public on Project activities and to hear and respond to comments. These meetings will be held quarterly in the Project area during engineering and construction and annually during Project operation for the life of the Project.

PDF GHG-1: SF_6 Monitoring.

All SF_6-containing circuit breakers that are installed under the Project shall be cataloged and monitored pursuant to California state law and the recommendations of the SF_6 Reduction Partnership for Electric Power Systems.

2.4.16 Project Safety

As part of the licensing process, the FERC will review the adequacy of proposed Project facilities. Special articles would be included in any license issued, as appropriate. Hydropower is one of the project types in which the FERC regulates both the construction and operational phase of a project. As described on the FERC's website,

> …dam safety is a critical part of the FERC's hydropower program and receives top priority. Before projects are constructed, the FERC staff reviews and approves the designs, plans, and specifications of dams, powerhouses, and other structures. During construction, FERC staff engineers frequently inspect a project, and once construction is complete, FERC engineers continue to inspect it on a regular basis. : http://www.ferc.gov/industries/hydropower/safety.asp

Dams are designed to standards promulgated to prevent to the maximum extent possible the potential for a dam failure. The FERC Office of Energy Projects (OEP) has published Engineering Guidelines for the Evaluation of Hydropower Projects which provides guidance to FERC technical staff for the processing of applications for license and in the evaluation of dams under Part 12 of the FERC's regulations. These guidelines can be found on the FERC website at http://www.ferc.gov/industries/hydropower/safety/guidelines/eng-guide.asp

FERC staff will inspect the licensed Project both during and after construction. Inspection during construction would concentrate on adherence to FERC-approved plans and specifications, special license articles relating to construction, and accepted engineering practices and procedures. When the FERC issues a license authorizing major construction, the license includes a requirement that the licensee employ a board of qualified independent engineering consultants, approved by the FERC, to review the design, plans and specifications, and construction of the Project. Also, the board is expected to assess the construction inspection program, construction procedures and progress, planned instrumentation, the filling procedures for the reservoir, and plans for surveillance during initial filling of the reservoir. FERC staff reviews the consultant's reports and examines all recommendations made by the State Water Board.

Operational inspections would focus on the continued safety of the structures, identification of unauthorized modifications, efficiency and safety of operations, compliance with the terms of the license, and proper maintenance. In addition, the license will require an inspection and evaluation every 5 years by an independent consultant and submittal of the consultant's safety report for FERC review.

Part 12, Subpart C of the FERC's regulations provides general requirements for Emergency Action Plans (EAP) at hydropower projects under the FERC's jurisdiction. Section 12.20 (a) of FERC's regulations requires every licensee to develop and file an EAP with the Regional Engineer unless granted a written exemption in accordance with Section 12.21 (a) of the regulations. The EAP must be filed with the FERC no later than 60 days prior to the filling of the reservoirs. A comprehensive review of the EAP must be prepared by the licensee annually. An EAP is a formal document that identifies potential emergency conditions at a dam and specifies preplanned actions to be followed to minimize property damage and loss of life. The EAP specifies actions the licensee should take to minimize or alleviate the problems at the dam. It contains procedures and information to assist the licensee in issuing early warning and notification messages to responsible downstream emergency management authorities of the emergency situation. It also contains inundation maps to show the emergency management authorities the critical areas that require action in case of an emergency. The EAP will address the concerns expressed in the comment letter regarding the handling of emergencies.

The proposed Project will also comply with California DSOD regulatory requirements. California DSOD engineers and engineering geologists review and approve plans and specifications for the design of dams and oversee their construction to insure compliance with the approved plans and specifications. Reviews include site geology, seismic setting, site investigations, construction material evaluation, dam stability, hydrology, hydraulics, and structural review of appurtenant structures. In addition, DSOD engineers inspect dams on a yearly schedule to insure they are performing and being maintained in a safe manner.

A Potential Failure Mode Analysis is conducted for all FERC-regulated dams that are required to undergo Independent Consultant safety inspections as defined in 18 CFR Part 12, Subpart D. A Potential Failure Mode Analysis is an exercise to identify all potential failure modes under static loading, normal operating water level, flood and earthquake conditions including all external loading conditions for water retaining structures and to assess those potential failure modes of enough significance to warrant continued awareness and attention to visual observation, monitoring and remediation as appropriate.

The FERC Division of Dam Safety and Inspections (D2SI) monitors the security programs and measures implemented by dam owners. The D2SI conducts periodic security inspections of projects based on the current threat conditions and as determined by the Attorney General and the Office of Homeland Security in order to insure the security of FERC hydropower projects. These inspections determine if the licensees have implemented a security plan appropriate to current threat conditions while remaining flexible enough to address elevated threat conditions. As a special focus of the Dam Safety Inspections, the FERC D2SI Engineer evaluates the level of security that is in place at facilities having the potential of causing significant to high consequences if attacked (Security Group 1 Dams). These dams are required to have completed:

- Vulnerability Assessment (updated annually, and reprinted within the past 5 years).
- Security Plan (updated as changes are made to security and/or procedures; at least annually). In addition, the Security Plan for a Security Group 1 Dam must be exercised at a minimum of every 5 years. The Security Plan must also show how the expected response can be increased as a result of changing threat conditions. The Security Plan must also contain a sub element, which shows how security and emergency notification/response actions are integrated and how the Project can recover rapidly
- Annual Security Compliance Certification Letter (due annually by December 31 and submitted to the FERC Regional Engineer). The letter certifies compliance with the Security Group 1 Vulnerability Assessment and Security Plan requirements, highlighting any parameters that have changed from the previous year (effective date of December 31, 2010).

2.4.17 Employment / Hours of Operation

The majority of required manpower is needed during construction, particularly in the timeframe approximately 2 years into the construction period, with considerably less needed in the first and last years. The Project is expected to commence construction activities 2 years after licensing. Peak monthly employment would occur in Year 2 with a high of 209 employees.

It is expected that most of the general labor required during construction would be available from the labor pool within Riverside County and the Project region. As much as 50 percent of the skilled trades and management and support personnel could also be provided by regional labor.

At Project buildout, during the operation phase, it is anticipated the pumped storage facility would operate 24/7 and utilize a permanent workforce of approximately 30 full-time employees over three shifts within a 24-hour period.

2.5 Identification of Potential Environmental Impacts

The State Water Board identified the following potential environmental resource issues during its review of the Project application and supporting materials, and through input received during the scoping process, including comment letters received in response to the Notice of Preparation, and site visits and additional background research conducted by staff for the proposed Project. Implementation of the proposed Project may result in the following changes, which are further evaluated individually within Section 3 of this Draft Final EIR:

Geology and Soils – Construction activities of the dams and reservoirs, and along the water conveyance corridor or transmission line corridor, and Project operations may have the potential to impact the geological resources on-site.

Surface Water – Construction activities along the water conveyance corridor or transmission line corridor, and Project operations planned at the facility may impact desert dry washes, groundwater levels, groundwater quality, or springs and wells.

Groundwater – Construction and operation will affect this resource. This section discusses groundwater quality and supply data for the Chuckwalla Groundwater Basin, aqueducts, springs/wells, water bearing formation, and hydraulic characteristics.

Agricultural Resources – This discussion focuses on the Project's compatibility with existing agricultural and forestry land uses.

Biological Resources – Construction and operational activities planned at the facility, and along the water conveyance corridor or transmission line corridor may impact plant communities and wildlife. The Project will be required to adhere to federal, state, and regional biological plans.

Threatened & Endangered Species – Project implementation may impact state- and federally-listed threatened and/or endangered species having the potential to occur on-site, or having suitable habitat on-site or in the Project vicinity.

Aesthetic Resources – The physical character of the site will be modified. The overall aesthetic appearance of the facilities as viewed from off-site requires evaluation to ensure consistency with national and regional standards.

Cultural Resources – Construction and operational activities proposed at the pumped storage hydroelectric facility or along the water conveyance corridor or transmission line corridor may have the ability to impact archeological, paleontological, or historical resources within the Area of Potential Effect (APE).

Land Use / Public Services – Construction and operational activities proposed at the pumped storage hydroelectric facility, and along the water conveyance corridor or transmission line corridor will change the existing land use on-site, and have the potential to affect public services times and utility capacities. The existing land use is an out of use iron ore mine that has been inactive as an iron mine since at least the early 1980s. At present, gravel mining and paramilitary training is reportedly conducted on the site. Development on this site will be evaluated for compatibility with surrounding land uses and correspondence with the national and regional long term goals.

Recreation – Construction and operational activities proposed at the pumped storage hydroelectric facility may have the ability to impact surrounding recreational areas, including the Joshua Tree National Park and Wilderness Area.

Population / Housing – Construction and operational activities of the proposed pumped storage hydroelectric facility may increase population and/or housing demands within the region.

Transportation – Construction activities have the potential to temporarily increase traffic and decrease level of service on local roadways.

Air Quality – Construction activities, and truck and automotive traffic anticipated and planned at the facility will generate emissions and dust that may have an effect on local and/or regional air quality.

Noise – Construction activities of the pumped storage hydroelectric facility could generate increased noise levels adversely affecting surrounding sensitive receptors.

Greenhouse Gas (GHG) Emissions – Construction may affect GHG levels, however, operational activities would displace energy demand for single-cycle natural gas power plants and if effectively used would reduce GHG emissions necessary for meeting the energy demands in California and assist meeting future targets for a larger portfolio of renewable power generation sources.

Hazards & Hazardous Materials – Construction and operational activities may impact potential public health and environmental issues related to hazards and the use of hazardous materials associated with construction and operations proposed for the Eagle Mountain Pumped Storage Project area. This section also describes potential wildland fire hazards.

Environmental Justice – Although not required under the CEQA, the Draft Final EIR provides this discussion relevant to applicable regulations and policies. This section addresses the question of whether and how the impacts of the proposed Project and alternatives may disproportionately affect minority populations and low-income populations or Native American communities.

2.6 List of Approvals and Permits Required

Table 2-4 lists the approvals and permits anticipated to be required for the proposed Project.

Table 2-4 Approvals / Permits Required for the Proposed Project	
Agency	**Approval / Permits**
Federal Agencies	
Federal Energy Regulatory Commission	License and approval of final engineering design, dam design, and oversight of Project construction
Bureau of Land Management	Right-of-Way for areas within the Project boundary managed by the BLM.
U.S. Fish and Wildlife Service	Incidental Take Permit, Section 7, Endangered Species Act
State Agencies	
State Water Resources Control Board	Water Quality Certification (Clean Water Act Section 401)
California Department of Fish and Wildlife	Streambed Alteration Agreement (Fish and Wildlife Code Section 1600) and Section 2081 (California Endangered Species Act) permit
Metropolitan Water District of Southern California	Right-of-Way encroachment approval for transmission line and water pipeline crossings of the CRA and related MWD facilities and lands
California Department of Transportation	Encroachment permits for transmission line and water pipeline crossings of state and federal highways
California Division of Safety of Dams	Approval of dam design, oversight of dam construction
South Coast Air Quality Management District	Permits to operate for all stationary fossil-fueled equipment such as diesel-fueled emergency generators subject to Clean Air Act regulations
County of Riverside	Encroachment permits for transmission line and water pipeline crossings of County roads

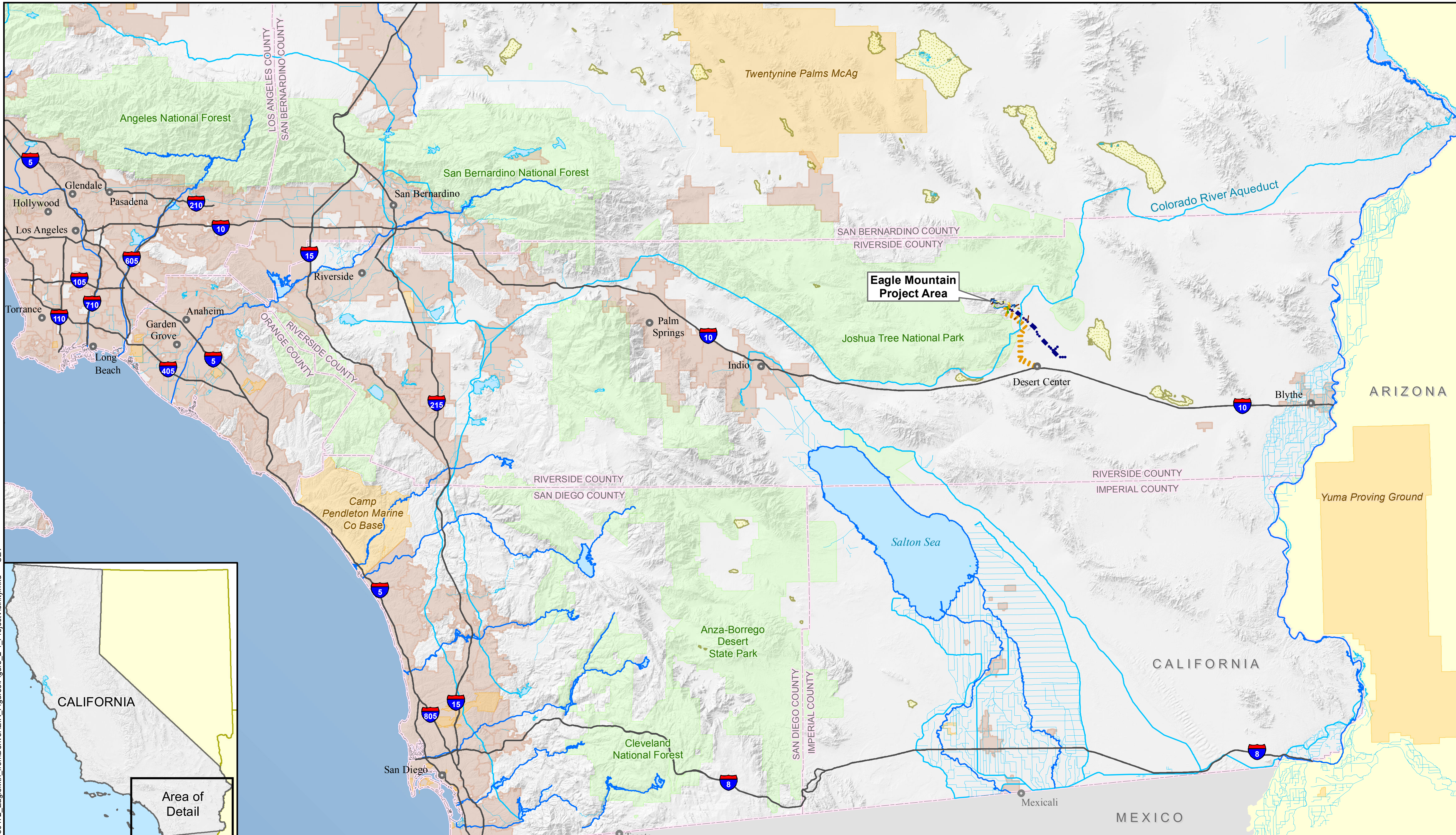
2.7 Agencies Expected To Use This Draft Final EIR

The State Water Resources Control Board is the Lead Agency under CEQA for preparation of this Draft Final EIR and is responsible for certifying its contents, and taking action to approve or deny approval of the proposed Water Quality Certification for this Project. Other California state agencies with discretionary approval of permits for the Project that will – as responsible and/or trustee agencies under the CEQA – use this Draft Final EIR in consideration of their permit approvals and conditions. As identified in Table 2.4 above, the responsible agencies in this case include CDFW, California Department of Transportation, County of Riverside, Metropolitan Water District of Southern California, and possibly the South Coast Air Quality Management District.

The Federal Energy Regulatory Commission is responsible for conducting environmental review under the National Environmental Policy Act (NEPA), as part of Project licensing and will rely upon its own Environmental Impact Statement (EIS) in its decision-making. The Bureau of Land Management and U.S. Fish and Wildlife Service must also rely upon the FERC EIS in support of their decision-making process.

2.8 Environmentally Superior Alternative

The State Water Board has evaluated the potential environmental impacts of the applicant proposed project. This analysis is found in Section 3 of this document. Alternatives have been evaluated to lessen the potential impacts of the project. The environmentally superior alternative is depicted on Figure 2-9.



City	County	Urban Area	
Major River	Playa	Military Land	
Major Canal, Aqueduct	Major Lake	State, National Park	

0 10 20 Miles

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Environmental Impact Report
prepared for State Water Resources Control Board
by GEI Consultants, Inc.

Eastern Riverside County, California

California Water Boards — State Water Resources Control Board — Regional Water Quality Control Boards

PROJECT VICINITY

January 2013

Figure 2-1

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